CLASSIFICATION S-E-C-R-E-T

CENTRAL INTELLIGENCE AGENCY
INFORMATION FROM
FOREIGN DOCUMENTS OR RADIO BROADCASTS

REPORT

CD NO.

50X1-HUM

COUNTRY	USSR
SUBJECT	Economic; Technological - Industrial methods
HOW PUBLISHED	Daily newspapers
WHERE PUBLISHED	USSR
DATE PUBLISHED	15 Mar - 8 May 1951
LANGUAGE	Russian

DATE OF INFORMATION 1951

DATE DIST. 6 Oct 1951

NO. OF PAGES 5

SUPPLEMENT TO REPORT NO.

THIS IS UNEVALUATED INFORMATION

SOURCE Newspapers as indicated.

CONSERVATISM STIFLES APPLICATION OF ADVANCED CASTING, STAMPING METHODS; MECHANIZATION HAS FAR TO GO

BOOKS, COURSES LACKING ON NEW PROCESS - Leningradskaya Pravda, 8 May 51

Improved technology in metal processing, combined with curtailment of metal losses, is best achieved through the application of two measures. The first is the utilization of high-speed methods of mechanical and electromechanical machining; the second, turning out shaped billets of optimum allowances, so that subsequent machining is either obviated or reduced to a minimum. These two measures fall under the common heading of "processing metal without removal of chips."

One method which belongs to the second, or casting group of the above category, is precision casting, in which patterns are melted or burned from molds. It produces complex castings with low allowances, but it is rather slow and is not capable of turning out metal of high strength and solidity. The process is practicable and profitable only in the manufacture of intricate, thin-walled parts, chiefly of steel.

Another method, precision hot stamping, is particularly effective in turning out parts of steel and nonferrous alloys with minimum allowances and well-consolidated structure; however, for particularly complex parts with thin walls, the process is very seldom applied.

Die casting, a third method of the group, produces parts with smooth, finished surfaces, superior to cut or milled areas, including openings and threads. The complete automatic mechanization of the process makes it highly productive, exceeding that of multiple-operation cold stamping. It is, however, limited to small parts of complex configuration, and is not suitable for casting parts able to withstand heavy stresses.

The search for a method combining all the advantages of the above without their shortcomings led to the development of crystallization under pressure of a piston. At first this method was applied in turning out ingots of nonferrous metal. Now it has been perfected to a point where it can be used in turning out not only ingots and bars of nonferrous metal, but complex parts, including such items as press molds having intricate recesses.

CLASSIFICATION S-E-C-R-E-T

STATE	X	NAVY	X	NSRB		DISTRIBUTION									
ARMY	X	AIR	X	FBI											

The essentials of the method are as follows. An amount of metal equal in weight to the finished part is poured into a metal mold. A hydraulic or pneumatic piston is pressed down on the surface of the molten metal, forcing it into the recesses of the mold. As the metal is being subjected to this pressure, the crystallization process takes place, preventing the formation of bubbles which might be caused by gas or shrinkage. At the same time it improves the mechanical quality of the alloy. When considerable pressure is applied, the surface of the casting obtained is faultless.

Actual production figures are proving this new method to have no equal. In a number of plants where this method was substituted for centrifugal casting in the manufacture of bearing bushings, metal expenditure was cut to one third and productivity rose above that of all other methods. In one Leningrad plant a switch to crystallization under pressure from customary casting processes in the manufacture of worm gears reduced rejects from 30-40 percent to 0.5 percent of the output. The same method, applied in casting bronze worm gears at the Ural Car-Building Plant, made it possible to cut the weight of the castings in half, improving their quality at the same time.

The new method is ideal for the manufacture of complex thin-walled parts having side openings; with the use of pure aluminum, such parts can be turned out for machines used in the food industry. The Plant imeni Maslenikov employs the method in producing parts for milking machines. A number of parts, formerly joined together by tin solder, may now be turned out in a single unit. The plant is realizing a yearly saving of one million rubles as a result of applying the new method.

Crystallization under pressure has proved particularly suitable for turning out curvilinear press molds for the rubber industry. All these press molds are now being made by this method. Formerly the molds were finished on milling machines, and production was too slow to keep up with the demand at the Leningrad Krasnyy Treugol'nik Plant, where they were being used up at the rate of 2,000-3,000 a month.

Despite its increased industrial utilization, crystallization under pressure can be applied much more extensively than it is; yet the conservatism of many plants and enterprises is keeping it out of fields where it could be used profitably.

The Vtormet /Main Administration for Procurement, Processing and Sale of Scrap Metal/ plants are now turning out a very low grade of ingot, containing many gas and shrinkage bubbles. Crystallization under pressure would produce sound ingots. The only "problem" in the way of establishing this method in production is the installation of the simple hydraulic presses required. The plant directors, however, are indifferent to the whole idea.

The new method was successfully applied in producing piston rings and other parts for locomotives. The rings proved to be of excellent quality and prevented the escape of steam. The way was thus opened for the elimination of rejects and a saving of millions of rubles, but neither the Ministry of Transportation nor the Southwestern Railroad System are making any haste to introduce crystallization under pressure into the technology of their enterprises.

The institutions of higher technical education demonstrate to a great extent the conservatism which stands in the way of the new method. Only a few of them, such as the Leningrad Institute of Kinetic Engineering, are devoting attention to the application of high pressure in casting processes. Others, such as the Institute of Precision Mechanics and Optics, are completely disregarding the method.

The situation regarding literature and instruction booklets on the new process is poor also. The Ministry of Higher Education takes a surprising attitude toward the question, refraining from issuing textbooks on the subject simply because there are no courses on it in the institutions of higher technical education. The ministry itself, however, is responsible for the absence of courses, for it does not deem it necessary to keep in step with the march of technology.

The final problem is that of equipment. The pneumatic, hydraulic, and friction presses now used in industry are not adaptable to the new process. Plants making hydraulic press equipment should establish series production of new presses to serve in crystallization-under-pressure units. These units should be built according to designs which have long been in existence, and patterned after the working models which have already performed so well on tests.

PERMANENT MOLD METHOD BOOSTS PRODUCTIVITY, CUTS REJECTS -- Yerevan, Kommunist, 15 Mar 51

As a result of improvements in molding techniques, the foundry of the Yerevan Electrical Machine Building Plant is producing at three times the 1949 level. Internal casting flaws were cut in half, and over 400 tons of pig iron and about 60 tons of coke were saved during 1950. By the application of a new method, the weight of a casting for a front generator panel was reduced from 103 to 79 kilograms, while 20-25 molds for the part were turned out in one shift, as against the old figure of seven or eight per shift. This technological change effected a 33-percent saving in molding material, and a yearly saving of 230 tons of iron, 20 tons of coke, and over 18,000 rubles in the production of this one part alone. Flaws were cut one third.

Labor productivity went up considerably after the introduction of standard fittings for making patterns for such small parts as flanges, nuts, slide blocks, and valve bodies.

Permanent-mold casting is raising labor productivity, reducing rejects, and freeing areas formerly devoted to molding. Making molds for generator mountings, for example, took up 25 percent of the shop's area. Furthermore, 22-25 percent of the finished castings were unsound. After this part was switched to permanent-mold casting, labor productivity rose five times, and rejects were reduced to 3 percent of the total mountings cast. -- P. Khachikyan, chief metallurgist, Yerevan Electrical Machine Building Plant

QUALIFIED FORGERS, STAMPERS SCARCE -- Leningradskaya Pravda, 28 Mar 51

At a meeting of technologists held in Moscow in 1947, it was noted that only 25 percent of the metal going into production throughout the nation was processed under pressure. This aspect of manufacturing, which comprises forging and stamping, shares top priority with high-accuracy casting among the advanced technological methods which should be energetically and broadly pushed in the machine-building industry. The minimizing of allowances realized under these two processes not only saves metal, but reduces the amount of subsequent machining, and in some cases obviates it.

In the manufacture of 20- to 150-millimeter bolts, for example, the substitution of upsetting for machining is effecting great savings. In turning out a specified quantity of bolts on automatic machine tools, 345 grams of metal are lost in chips. When the bolts are made by upsetting, with subsequent rolling of the threads, only 14 grams of metal are lost.

In machining a 17-kilogram crankshaft from rolled metal, 185 percent of the weight of the finished part is wasted in chips. If it is machined from a forging, 80 percent is lost in chips. When the same item is machined from a stamping, only 30 percent of the weight of the finished part goes into chips.

At the Plant imeni Karl Marks, the substitution of cold stamping for casting in the manufacture of certain parts for textile machines saved 1,100 kilograms of metal for each machine, effecting a yearly saving of 800,000 rubles.

Some of the country's leading plants, including the Moscow Automobile Plant imeni Stalin, the Bearing Plant imeni Kaganovich, the Gor'kiy Automobile Plant imeni Molotov, and various tractor plants have successfully introduced advanced forging and stamping methods. All these plants utilize high-precision hot stamping, electrical heating of the metal prior to stamping, and periodic rolling.

The proportion of forging and stamping machines in industry is growing. In the automobile and tractor industry these machines already constitute 20 percent of the entire park of metal-processing equipment. On the other hand, there is great room for substitution of more modern machines for old ones of this category.

The park of forging and stamping machines in Leningrad plants has hardly changed since the war, while the park of metal-cutting machinery has been renewed and supplemented with more modern machines. The forging and heat-treatment shop of the Leningrad Kirov Plant, for example, which makes chiefly forgings for tractors, is equipped with drop hammers only. Mass production of turbine blades at the Leningrad Plant imeni Stalin is also carried out under the drop hammer. There are only six crank presses, die presses, and embossing presses in all the Leningrad plants.

The situation is further aggravated by the shortage of qualified workers in the fields of forging and stamping, while institutes have not enough laboratories devoted to this phase of technology. The attitude held in many plants toward the question is one of conservatism.

The backwardness shown in Leningrad in regard to modern casting and stamping methods is intolerable for such a great industrial center.

MANY ANCILLARY OPERATIONS STILL DONE BY HAND -- Moscow, Pravda, 25 Mar 51

Despite efforts of the machine-building industry to raise the degree of mechanization in all branches of industry, there are still many enterprises in which assembly, fitting, and preparatory operations are performed 40-50 percent by hand.

Hand labor in the field of machine building is greatest in ancillary operations, including painting, installing, loading, and transportation. Hand labor is not uncommon, however, in even the most vital phases of production. In the foundries of plants of the Ministries of Electrical Industry and of Construction and Road Machine Building, a considerable amount of molding and cleaning is done by hand. In plants of the ministries of Machine and Instrument Building and of Machine Tool Building, machine molding constitutes a very small portion of the entire molding output. The percentage of highly productive and precision methods of casting is extremely low.

While machine shops are generally considered to be completely mechanized, there are still shops in which the workpiece is set up by hand, not to mention many other operations connected with the operation of the machine tools, which are also done by hand.